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DDP 63 - 2013

*Equip + Supplies*

12 June 1963

MEMORANDUM FOR: Executive Director, NPIC

SUBJECT : NPIC Proposal for Rental of IBM 1410
System

REFERENCE : NPIC/D-55-63, memo to Chairman, CIA ADP
Committee frm ExDir/NPIC dtd 15 May 63,
subj: Rental of IBM System for NPIC

1. Members of the ADP Staff met with NPIC personnel
on 29 May to study the referenced proposal and prepare a
technical appraisal.

2. Attached for your consideration is the ADPS
report. In brief it suggests: (a) that NPIC consolidate
its data processing and mensuration computer staffs and
work toward physical merger of operations on a compatible
hardware configuration; (b) as a pro tem measure, increase
printing capability by adding faster equipment to the 1401;
and (c) request UNIVAC to study the data processing appli-
cation and recommend an implementation plan.

3. Viewing your current status and projected computer
requirements, the above recommendation strikes me as being
a logical and constructive alternative. As per our tele-
phone conversation, I am returning your original paper
herewith and await your reaction to our counter-suggestions.

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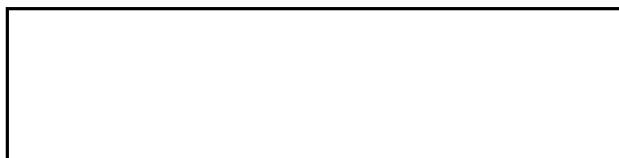
Chairman
CIA Automatic Data Processing
Committee

Attachments:
  Memo for D/L frm ExDir/NPIC dtd 7 May 63
  ADPS report dtd nn Jun 63
cc: DD/I Atten: Mr. Borel (w/rpt att)
   DD/S (w/rpt att)
   Mr. D. [ ] (wo/att)

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GROUP 1
Excluded from automatic
downgrading and
declassification

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4 June 1963

NPIC Proposal for Rental of IBM 1410 System

Discussion

1. NPIC has proposed that it should acquire immediately a 1410 system including a 1301 disk file to replace the 1401 tape system which is now being used to service all its data processing requirements. On 28 May 1963, Messrs. [_____] were selected to make a technical appraisal of the proposal and to submit their findings by 4 June. Time was inadequate for a methodical system study so the group's effort was largely restricted to studying the NPIC written proposal and to discussion (29 May) of this question with Messrs. [_____] of NPIC.

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2. Besides its present 1401 system, NPIC has a UNIVAC 490 computer, which is now being programmed for mensuration computations. The 490 is a large computer which appears to have the capacity to absorb the projected data processing workload in addition to the mensuration job. In the memorandum from Chief, ABP Staff, to the CIA Automatic Data Processing Committee, dated 27 September 1961, which approved the rental of the 1401 for NPIC, is contained the following paragraph:

   > "5. The 1401 installation is to be considered interim
   >   pending installation of NPIC's main computer. At
   >   the time this is clearly determined, the desirability
   >   of doing the 1401 job on the main computer will be
   >   examined in detail. Every attempt will be made to
   >   avoid having two separate computer installations if
   >   at all possible."

   If the data processing application is to be transferred eventually to the 490 (the "main computer" referred to in the excerpt quoted above), then the system adopted to accommodate the increasing requirements for data processing within NPIC should be designed to facilitate the transfer.

3. In its request for substitution of the 1410 for the 1401, NPIC has addressed itself to the desirability of converting the 1401 applications to the 490 and concluded:

   > "that such conversion is neither desirable nor feasible
   > at this time and that the question of ultimate convergence
   > of the two systems should be deferred until the 490 real
   > time mensuration system is in full operation and the com-
   > munity demands upon the IBM information processing system
   > stabilize. We believe that further consideration of con-
   > vergence should be deferred for two to four years."

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This conclusion is based upon five major considerations, each of which will be discussed in detail in another portion of this paper. (See Appendix III.) However, the implications of a decision to postpone even the consideration of convergence constitutes, in our mind, a further decision which is to encourage development of two distinct computer operations within MPIC.

4. If MPIC fully develops a 1410 disk-oriented system for data processing and the 490 systems planners continue for at least another two years to develop the mensuration system without regard to possible time sharing of the 490 central processing unit, we believe that it is highly unlikely that the two systems will ever be merged. Even if the decision to merge the systems were made some two years hence, it would be much more difficult to effect the merger at that point in time than it would be if both systems now began working toward a combined system.

5. If the intent expressed by the CIA Automatic Data Processing Committee is still valid, (and we think it is), then it follows that planning for a single MPIC computer center should begin immediately and only those additional capabilities which are essential to continuing operations pro tem should be added to the present 1401 system. At least part of the MPIC data processing staff should become familiar with the 490, and the mensuration staff should incorporate within its plans provisions for sharing its computer time with the data processing staff.

6. It cannot be asserted with complete confidence that the data processing and mensuration jobs can be merged effectively on the 490, although both the capacity of the main frame and the relationship of the two jobs are apparently consonant with such an arrangement. (Further the executive program for the 490 (REX) should greatly facilitate the programming required to use the 490 for both mensuration and data processing.) What is really needed at this time, however, are facts and estimates about present and future MPIC computing needs which can be acquired only from a thoroughgoing system study of the MPIC operation. This same recommendation was made by the ADP Committee in its memorandum of approval for the 1401 for MPIC. Such a study is needed now more than ever.

7. In summary, there are two alternative ways to meet the growing computing and data processing requirements of MPIC. The first is to install the proposed 1410/1301 system immediately and begin development of a medium-scale data processing center separate and distinct from the 490 mensuration center. The second is to upgrade the present 1401 system to enable it to handle the increasing workload while at the same time beginning to move toward an eventual merger of the data processing and mensuration applications by developing a combined system design and working toward a consolidated computing staff.

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Recommendations

8. Specifically, we recommend that NPIC:

    a. Accept now and start moving toward a single computer center for NPIC.

    b. Institute an immediate study, not to exceed 3 months, with the following objectives: (1) to design for the UNIVAC 490 an appropriate system, probably with random access capability, for the data processing application; (2) to draw up an implementation plan.

    c. Take immediate steps to upgrade the present 1401 hardware to the extent necessary to continue the data processing application until its transfer to the 490 can be accomplished. These steps might include:

        (1) Replace the present 7330 tape drives on the 1401 with the faster 729-5 tape drives. (Input/output data transfer rates will increase by a factor of three with the faster 729 tape drives.)

        (2) Extend core memory to 16K.

    d. The upgraded 1401 system described above is the preferred hardware. Should this prove to be inadequate, however, the 1460 with the 1403 Mod 3 printer (1,100 lines/minute) is another alternative that might be considered.

    e. Perform only the minimum additional programming required to operate the 1401 system over the next 1-2 years.

    f. Begin training 1401 programmers on the 490 and then begin to program the data processing application for the 490. Hire, or contract for, additional 490 programmers, if required. (Presuming the 490 programmers are completely occupied working on the mensuration programs, a combination of the present 1401 programmers plus additional staff programmers or contractor programmers should work on the data processing application in order to minimize disruption of the work on the mensuration problem.)

    g. As required, acquire additional components, such as expanded memory and a second drum, for the 490 (See Appendix II).

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APPENDIX I

Appendices I and II contain descriptions of each of the systems considered for the data processing application including: 1) principal units of hardware, 2) an estimate of the total cost, 3) an evaluation of its capabilities and 4) a discussion of the implications of the system for the future NPIC computer center(s).

IBM 1410 disk-oriented system as proposed by NPIC.

1) 1   1411-3   processing unit

    2   1414-1   I/O synchronizers

    1   1414-3   I/O synchronizer

    1   1415-1   console

    1   1402-2   card read punch

    1   1403-3   printer

    4   729-5   magnetic tape units

    1   1301-2   disk storage

    1   7631-1   file control

2) $ 19,000 *

3) The proposed system is well balanced and affords a consider-
    able random access capability combined with an improved
    input/output capability. Present NPIC processing require-
    ments would not appear to require 40,000 core positions,
    however, and if the 1410 were obtained, it would probably be
    advisable to limit the core storage initially to 20,000
    positions.

    The 1410/1301 system would provide sufficient disk storage
    to enable NPIC to have immediate random access to its en-
    tire central file which is now on four reels of magnetic
    tape. The 729-5 tape units and the 1403-3 printer would

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*   All cost estimates include additional features such as priority and
    overlap.

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increase the data transfer rates during input and output operations and thus reduce the running time of most of the present data processing programs.

One additional benefit resulting from the installation of the 1410/1301 system would be the compatibility of the associated software with similar systems in CIA, NSA and USAFE.

4) One fact that should be clearly recognized is that adoption of the 1410/1301 system by NPIC would greatly reduce the likelihood of eventual merger of the data processing and mensuration applications. In order to convert all its retrieval programs from tape to disk, NPIC would make a substantial programming investment which it would be reluctant to discard. Furthermore, the establishment of additional files on the disk and the inevitable development of a library of 1410 programs would make the conversion to the UNIVAC 490 appear unattractive. Also, the effort required to convert 1401 programs to the 1410 and to establish the disk system presumably would preclude the data processing staff from working toward conversion to the 490.

APPENDIX II

Upgraded 1401 system with a random access capability added to the 490. (The 1401 would be only an interim system, and the exact configuration of the 1401 and its balance with additional units on the 490 would be a function of the NPIC workload and the pace of the conversion process.)

1. **1401**

    1 - 1401   central processor with 8,000 core positions

    1 - 1402   card read punch

    1 - 1403-2   printer

    *4 - 729-5   tape drives

    To be added to the 490

    1   drum synchronizer

    1   drum storage

2. $13,000**

    3. If a random access capability is required for data processing, then it could probably be achieved just as quickly on the drum storage for the 490 as on the 1301 disk. As the data processing staff worked on the random access file, the problem of time sharing on the 490 could be resolved. (NEX should provide considerable assistance in this effort.)

    The later model tape drives for the 1401 would substantially increase the rate of data transfer and similarly reduce the time required for sorting, one of the most time-consuming operations under the present system.

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*   729-5 tape drives would be substituted for the 7330 tape drives.

**   This figure is the sum of the total cost of the upgraded 1401 system and the cost of the additional units added to the 490 to accomplish the data processing job.

Other options are available for both the upgraded 1401 system and for the 490. For example, 8,000 more core positions and two more tape drives could be added to the 1401. (One other interim system would be the 1460 with a 1403-3 printer attached. This system would almost double both internal processing speed and rate of printing.)*

Additional tape units could be added to the 490 and the Remington Rand 1004 card processor could be attached to the system for both on-line and off-line operations. Off-line, the 1004 could be used to print 400 132-character lines per minute. Also, the core capacity of the 490 could be doubled from 16,000 to 32,000 words and additional drums could be added.

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* The 1460 system would cost approximately $1500 more than the upgraded 1401 system outlined above.

APPENDIX III

Comments upon NPIC's reasons for deferring consideration of
convergence of the 1401 and 490 systems for two to four years.

a. **NPIC:** "It is too early to forecast ultimate requirements
   against either system. This is especially true for community
   demands; exploratory discussions with CIA components, the
   newly-established Defense Intelligence Agency and major
   military commands are just beginning."

   ADPS Comment: It is seldom possible to forecast "ultimate
   requirements" against information systems, particularly
   when they are as dynamic as those of NPIC. It appears very
   doubtful, however, that the forecasting will be any easier
   two years from now.

b. **NPIC:** "An immediate attempt to transfer 1401 applications
   to the 490 system would delay, for a significant period of
   time, the development of a real-time mensuration system.
   Conversely, NPIC immediate reporting requirements cannot
   tolerate the delays necessary to train programmers and re-
   program the 1401 applications on the 490."

   ADPS Comment: If the 490 has the capacity to absorb the data
   processing workload in addition to the mensuration computations,
   it is not clear why some initial attempts to convert 1401 jobs
   to the 490 would delay development of the mensuration system.
   If core capacity is the sole problem, there exists the
   capability of doubling the present memory of the 490.

   Since the 1401 system would continue to operate during
   the conversion of the data processing application to the
   490, there should be no decline in reporting capability; on the
   contrary, the recommended upgrading of the 1401 would increase
   such capability. Furthermore, the continuation of an ongoing
   system should enable the data processing staff to train those
   programmers for the 490 who had been designated to work on
   the random access system for the 1301. It must be remembered
   that the 1401 programmers who would be designated to program the
   1301 disk file would require retraining also.

c. **NPIC:** "Changes in the collection systems will have a major
   effect on the 490 system, requiring extensive reprogramming.
   Several new systems are already in late stages of development."

   ADPS Comment: The comments in b apply equally well here.
   Presumably the increased programming workload will fall upon
   the present mensuration staff.

d. **NPIC:** "Although the real-time mensuration response will probably take no more than five percent of the available time on the 490 system, batch programs necessary to prepare for the real-time capability are more time consuming than originally anticipated. It is possible that batch programs may require up to 80 percent of the prime shift time available on the 490 system."

AITS Comment: Even if the batch programs do require up to 80 percent of the prime shift time available on the 490, this would still leave more than one shift of machine time for data processing. One shift should be more than sufficient for NPIC data processing requirements, particularly if some of its input and output were done off-line (for instance, on a Remington Rand 1004).

e. **NPIC:** "It has already been found that major activities of both systems peak at the same time. This eliminates simple time sharing of one computer and requires careful evaluation of the details of each program to determine the possibilities for simultaneity of operation."

AITS Comment: Although it is stated that both data processing and mensuration activities peak at the same time, the logic of the overall process suggests a sequential operation--that is, the results of the mensuration should be a primary input to the production of listings to be used by the PI in the read-out phase. The careful evaluation of the details of each program would be useful at this stage of NPIC operations and would be a prerequisite for a successful merger of the 1401 and 490 jobs.